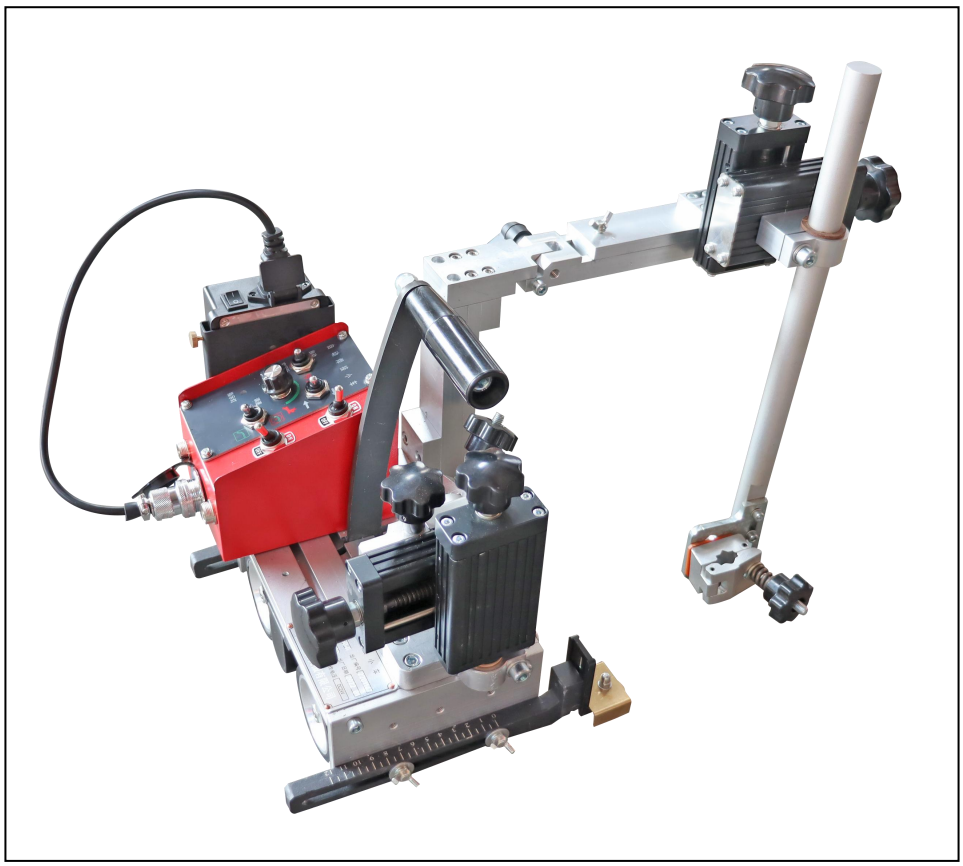
OPERATION MANUAL



Model GW-8SS-II

Double-torch Automatic Welding Carriages

Instruction

Thank you very much for purchasing this product. Read this instruction manual thoroughly to insure correct, safe and effective use of the machine. Read the manual first to understand how to operate and maintain the machine.
Make sure you read, understand and take all the necessary safety precautions.

Safety Precautions

This product is designed to be safe, but it can cause serious accidents if not operated correctly. Those who operate and repair this machine must read this manual thoroughly before operating, inspecting and maintaining the machine. Keep the manual near the machine so that anyone who operates the machine can refer to it if necessary.

★Do not use the machine carelessly without following the instructions in manual.

★Use the machine only after you completely understood the contents of the manual.

★For safety, it needs a qualified people to equip, check and repair the machine. The operation should be done by people, who understand the manual completely or has abundant experience.

★In order to do safety education, you should join a forum, which is organized by welding association and welding union or related association. You should take a welding engineer qualified exam.

★After reading the specification sheets, you should keep the manual near the machine so that anyone who operates the machine can refer to it if necessary.

★If an explanation in the manual is difficult to understand, contact our company of sales service office. The address and telephone number is on the back of the manual.

★If the manual become lost or damaged, place an order with our company or sales service office for a new one.

★When transferring the machine to a new owner, be sure to hand over this instruction manual as well.

Symbol	Title	Meaning
	General	General caution, warning and danger
	Be careful not to get your fingers caught.	Possible injury to fingers if caught in the insertion part.
	Caution: Electric shock!	Possible electric shock under special conditions.
	Ground this equipment.	Operators must ground the equipment using the safety grounding terminal.
	Pull out the power plug from the outlet.	Operators must unplug the power plug from the outlet when a failure occurs or when there is a danger of lightning.
	Caution against bursting	Possible bursting under certain conditions.
	General	General warning.
	Caution: Hot!	Possible injury due to high temperature under certain conditions.
	Caution: Ignition!	Possible ignition under certain conditions.
	Notice: magnet!	Magnet may generate magnetic field and magnetic wave.
	Please wear eye protector against light!	Must wear eye protector when observing welding arc.
	Please wear protective mask against dust.	Must wear protective mask when there is dust and fume in the production process.
	Don’t elevate!	Don’t elevate the machine in case of falling!

CONTENTS

1 Safety Instruction

Operation, inspection, and maintenance that disregard the basic safety rules cause many accidents. Carefully read, understand, and master the safety measures and precautions described in this instruction manual and on the machine before operating, inspecting, and maintaining the machine. The safety messages are classified as indicated on the machine safety labels:

★ Read this instruction manual before operating the machine.

★ When you equip the firing power, choose fixing position, store high-voltage gas, store productions and dispose abatement, you should do them according to lows and rules.

★ There are some precautions in the manual, which can prevent you and other people from damages.

★ If you operate the machine wrongly, it may lead to some damages. The damages can be divided into three types, which have individual signs and meanings. The signs and words are pasted on machine for warning.

sign	meaning	illustration
	Danger	It may lead to die or terrible damage.
	Caution	It may lead to die or terrible damage.
	Notice	It may lead to damage. In generally, it is dangerous operations.
	Precaution signs	Precaution signs are show to operator and maintenance person that it may lead the machine or external equipments to be damaged.

● Terrible damages are loss of sight, electric shock, burn, fracture, poisoning and so on, which may lead to sequelas or need be specially cured for a long time. The damage such as burn or electric shock need not be hospitalized cured. The actual damages are losses of assesses.

2 Safety precautions before operation

 **Precaution**

Please obey the following precautions in case of some terrible damages.

- ◆ The welding machine is designed considering the safety factors. But, you must operate it according the precautions in case of the terrible accidents.
- ◆ Must make other people leave away the operating space and work area.
- ◆ The melding machine can create magnetic field, which may influent some sensing devices and clocks. Based on the same factor, people, who has electrical pacemaker in heart, can’t be near of the operating machine.
- ◆ For safety, the equipment, maintenance, check, and repair should be done by people, who have been trained.
- ◆ Before operating the machine, you must understand the manual well.
- ◆ The machine must not be use to finish other works besides electric arc welding, which be illustrated in the manual.

- Don’t modify the machine.
- Before operation, you should check whether it is safe in case of accidents.
- When you carry the machine, you must catch the handle and carry it smoothly.
- If you want to touch the machine in the process of welding or after welding, you must wear protective gloves. Don’t touch it before the face cools.


Precaution

Please obey the following precautions in case of electric shock.

- Don’t touch charged parts, else it can lead to terrible electric shock or burn. When the power is on, the circuit and inner has charge. The capacity is charged even the power is off. When the welding power put out, the electric pole, metal base and the connected parts are charged.
- Don’t touch charged parts.
- According to rules to connect distribution box, metal base and other relate connection. All of this should be done by a qualified engineer.
- Before equipment, maintenance and check, you should cut off the power of carry-in terminal. When you cut off the power, capacity can’t be uncharged immediately, so you must make sure there is no residual voltage, then you can do maintenance and check.
- Do maintenance and check periodically. Repair the broken parts before operating the machine.
- Don’t use broken wire or underpower wire.
- The connection of the wire should be firmed and insulated
- You should firm the welding wire on the position of metal base.
- Don’t operate the welding machine under the condition of taking apart the frame or cover.
- Before you use the machine, you must cover the connector of power.
- Don’t use broken or damp protective gloves and wear damp clothes.
- Don’t operate the machine in outdoor after rain. Don’t operate it on the damp floor.
- Must use life buoy if you operate it on eminence.
- Cut off all the power if you don’t use it.
- Must equip fuse on the carry-in terminal of the power.
- Before use it, check the input voltage. The input voltage should be in the range of ±10% of the rated voltage. Don’t use it if the voltage is beyond of the scope.
- There are screw chasers on the metal plug of the hard rubber jacket. You should screw them and make sure no external force pull the plug in the process of welding.
- Ground the hard rubber jacket wire!
- You should stop operating, cut off the power and invite professional engineer to repair it if the following cases occur.
  - ▼ The wire is broken.
  - ▼ It is damaged because of the leakage.
  - ▼ Although operating it correctly, some failures occur.
  - ▼ The machine occur failures.
  - ▼ The machine can’t operate normally.


Precaution

Use some shields to protect you and other people from aureole, spatter, dross and noise.

- The aureole contents harmful ultraviolet ray and infrared ray, which may damage you eyes or burn them.

- The spatter and dross can damage you eyes.
- The noise can damage your aural comprehension.
- In the welding process, you should wear effective eye protector and protective gloves to protect you eyes.
- Set shields to protect others from damaging eyes.
- In the operating process, you should wear a complete set of shields. Such as leather protective gloves, leg encasing, leather protective skirt, helmet and safe shoes.
- You should wear safeguard to prevent noise when the noise is too high.

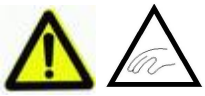
Precaution

Use shield to protect you and others from being damaged by fume in the welding process.

- There is fume in the process. These fumes can damage your health.
- If you operate in a small space, it may lead to apnea because of lack of oxygen.
- You should use antigas-helmet and waste disposal equipment according to the rules to prevent from intoxication and apnea.
- When the space is small, you should make the air draft well or wear antigas-helmet and ask an empirical person to monitor the welding process.
- If you weld on steel plate with zinc bed, it can lead to toxic gas. So, you should clear the zinc or wear antigas-helmet.

Precaution

- Please obey the following precautions in case of the gas bottle leaning or bursting.
- If the gas bottle leans, it may lead to some terrible accidents.
- There is high-voltage gas in the bottle. If you don't operate it in right way, the bottle may burst to lead to damages.
- Dispose the gas bottle according to the rules.
- Don't make the gas bottle in high temperature.
- Put the gas bottle on a special base in case of leaning.
- Don't create electric arc on the gas bottle. Don't put the torch on the bottle and make electric pole connect it.
- Don't make your head be near of the escape hole when open the bottle.
- Cover the bottle with shield when the bottle doesn't be used.
- Use the airmeter made by the same firm or recommended by the firm.
- Before use the airmeter, you should read the direction for use and operate it according to the rules.
- Don't use leaking or broken gas bottle
- The gas bottle only is used to special purpose.
- Don't smear oil or grease on the bottle.
- You should contact the distributor when gas bottle is difficult to open.



Precaution

Please obey the following precautions in case of damages by rotary parts.

- Don't make your hands, hair or clothes near of cooling fan of power or roller wheel of feeder, else you will be seized.
- Don't make your head near of the end of the torch when the welding wire is going, else the welding wire will damage your eyes.
- When the welding-wire reel releases, the welding wire may damage you.
- Don't take apart the frame or cover to use the machine.

- Let a professional people to take apart frame to do maintenance and check or repair. Set guard rail around the machine in case of other people being near of it.
- When you move or store welding-wire reel, you should make the welding wire stick to reel.
- When the welding wire goes into feeder, you should firm it in case of loose.

Precaution

Please obey the following precautions in case of firing, burst or explode.

- The spatter and hot metal base may lead to fire.
- If the steel bar isn't connected to other parts well, it may lead to fire because the resistance is too hot.
- If you create electric on oil container, it may lead to explode.
- Welding on encapsulate container may lead to burst.
- Don't weld on the space on which the spatter can contact combustibles and don't weld near inflammable gas.
- Don't put the overheated metal base after welding near combustibles.
- Welding on floor, wall may lead to fire in room. Before welding, you should take away the combustibles form room.
- Firm the connecter of wire and connect welding conducting wire on the position of metal base.
- Don't weld bottle full of gas and encapsulated container.
- In the welding space, there must be annihilator in case of fire.
- In the welding process, you can't carry cigarette lighter, match and other combustibles.

3 Outline of machine

3.1 Summary

CO2 welding trolley is used in many fields such as ship, bridge, train, steel structure, petroleum industry and so on. It is suitable for welding many structures such as stiffened web plate, ribbed plate, cross position, boxing beam and so on. There are some advantages.

- Reduce work intensity and improve working condition
- Increase working efficiency; it is 1.5 times in manual welding.
- Avoid defective quality of welding seam because of people. Defective percentage of manual operation is about 20%, but there is no defective percentage with auto welding trolley. Taking account of synthesis efficiency, it raises 200% efficiency more than manual operation.
- It is automated high, which makes sure the quality of welding.

3.2 Character

1. HW-20 carriage's welding position is in the middle of its body
2. It is used in general welding, especially long horns of the welding.

Caution: When arc extinction welding is needed, make sure the self-protection loop switch of welding machine is on (that is on the position of arc extinction) and the switch of welding carriage in the state of arc extinction; if the self-protection loop switch is off, the welding carriage can't work. When welding without arc extinction is needed, make sure the self-protection loop switch of welding machine is off and the switch of welding carriage in the state without arc extinction; if the self-protection loop switch is on, welding carriage stop operating but arc won't extinguish.

3. Carriage can weld while walking forward and backward.

4. It is easy to move and install the carriage under different conditions due to its small volume and light weight.

5. Carriage's movements have high stability because of synchronous four-wheel drive.

6. Start to weld when carriage is set on automatic control.

7. The number of stuff is reduced; a workman can make many dollies to weld at the same time.

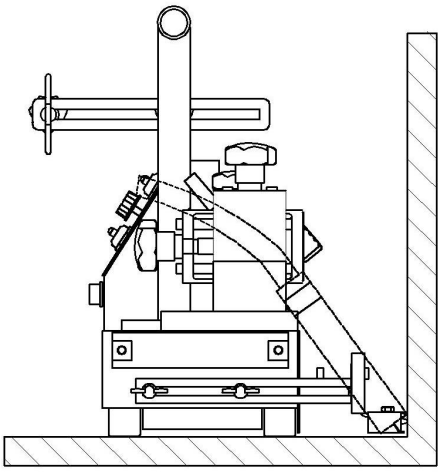
8. Workmen those who have not be trained can also weld. Due to equipment's miniaturization ,little weight and easy automatic operation, a workman without training can do better by it than technical worker using normal welding machine.

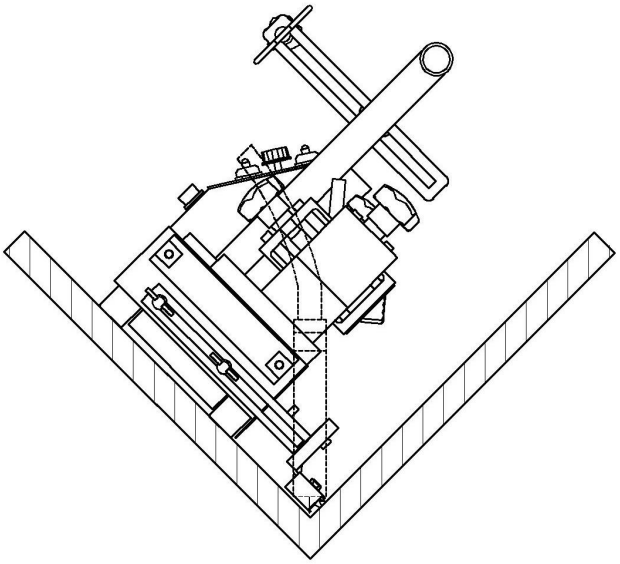
9. Equipped with fixator for welding gun, it can weld more stably to improve welding quality.

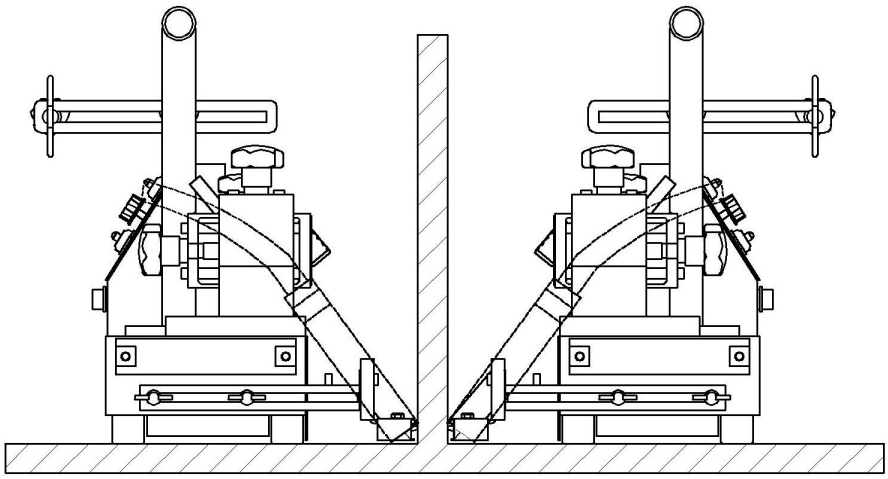
10. Aluminium extruded sections are assembled in mosaic pattern into baseboards; axles are equipped with extra silicon rubber sealing gaskets; carriage's internal dustproof effect is very good.

11. Because of the copper gear transmission of the carriage, systems can be prevent from magnetizing efficiently.

3.3 Suitable condition

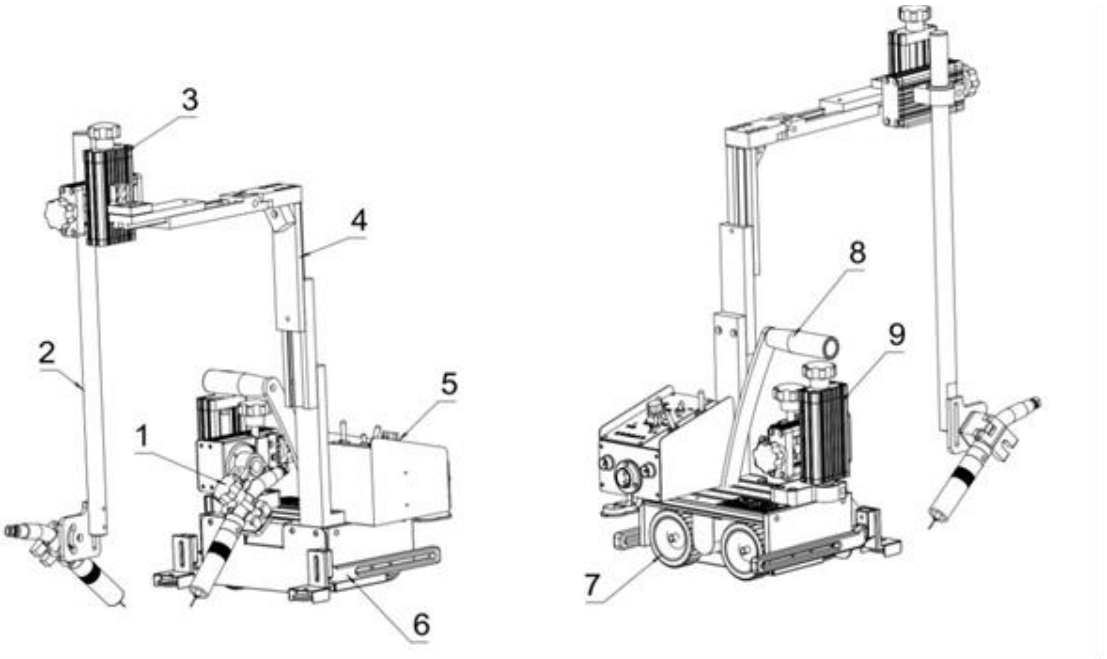






3.4 Constituent instruction

GW-8SS-II is made up of carriage body, guide wheel, to Torch, X-Y slide unit, weaving

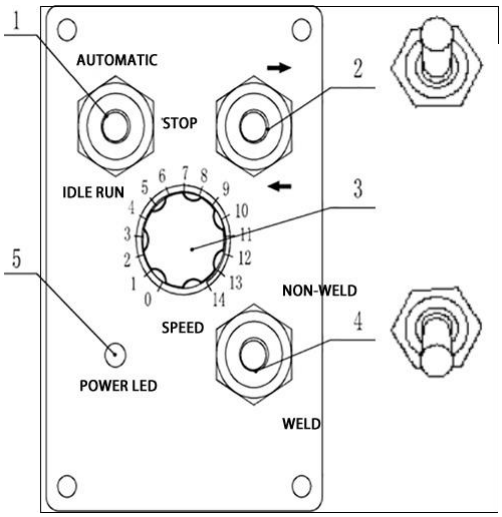


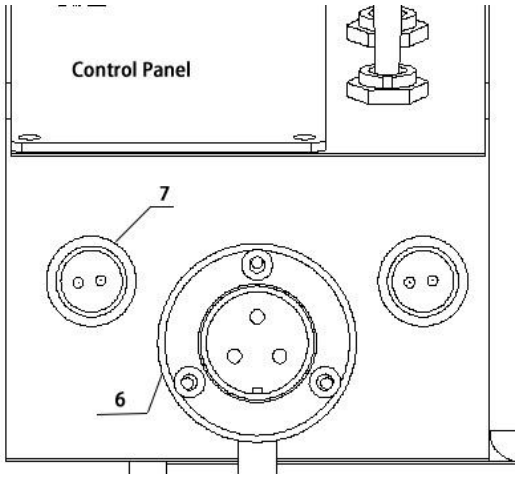
Unit, control box etc., among which the carriage base is the basis to bear other fittings.

carriage body：It is the frame of machine and carrier of others.

1	Torch Holder unit	6	Guide wheel bar
2	Holder Connection Bar	7	Wheel
3	X-Y Slie Seat for Torch 2	8	Carry handle unit
4	X-Y Slide unit		(or Magnetic control clutch handle)
5	Control panel	9	X-Y Slide seat for Torch 1

3.5 The control panel layout





1. Set the switch for diffident operation mode: Idle run, Automatic or stop.
2. Choose the switch for movement directions such as forward and backward (Arrow).
3. Set the speed by turning the speed adjustment knob.
4. C weld chine's state: weld and non-weld.
5. P wer is on or off.
6. Three-core socket: connected to power supply (DC24V).
7. Two-core socket: connected to the controlling switch of the Welding Torch.

3.6 Main technology parameter

1. size		W300mm×L(510-610)mm×H(410-550)mm
2. Main unit Weight		11.8Kg
3. Power		AC220V / DC24V
4. power		22W
5.adsorbability		10～25Kg
6. walking speed		50～900mm/min
7. Range of adjusting welding torch	Up/ down	50mm
	Left/ right	50mm
	Range of working angle	±45°
	Range of Proceeding angle	10°
	Range of Rotating angle	360°

4 Installation and operation

4.1 Preparation before operation

4.1.1 Preparation of tool

-- Welding power and wire feeder device.

-- (DC24V) welding regulated power for HW-20 walking and control

--Welding torch for CO_2 automatic welding

--CO_2 tank for welding

--Necessary tool for other operation

4.1.2 Connection mode of system

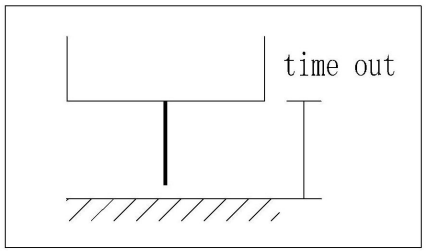
- Connect the three-pin plug of main power supply of carriage (transformer) with AC220V.
- Connect the three-core small metal socket of DC24V with the three-core socket of control cabinet.
- Connect the two-core socket of carriage with the switch wire of welding gun.
- Adjust welding state containing voltage and current and install welding gun. Regulate the angle of the welding gun and the steerable wheel. （While moving leftward, the left steerable wheel must be adjusted to be shorter than the right one; While moving rightward, the right steerable wheel must be adjusted to be shorter than the left one.）
- Clear up the litters above the carriage's movement route.

4.2 Welding operation

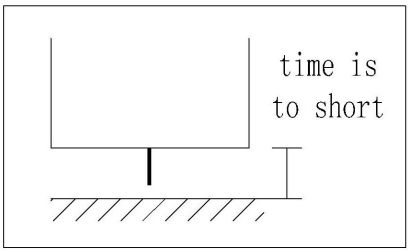
It is supposed the carriage is connected and electrified. When welding, regulate the moving speed of the carriage, adjust the welding power, voltage and the angle. Then set the switch for "weld and non-weld" on the position of "weld". If the switch for "automation, stop and racing" is set on the position of "automation", the carriage will start to move and weld; if the switch on the "racing", it move but not weld; if the switch on the "stop", all actions top.

4.3 Welding operation

1. Choose the diameter of the welding wire.
2. Choose a kind of welding wire, solid wire or flux-cored wire.
3. Turn on the power distribution disk switch.
4. Turn on the welding power source (The self-insurance circuit is OFF)
5. Turn on the valve of the CO2 bank and adjust the pressure to 2 — 3 Kg/cm^2, adjust the flow by
   the 'check' step of the gas switch.
6. Feed the wire to the tip of the torch manually and install the tip correspondent to the diameter of
   the wire.
7. Confirm the extension elongation of the wire.



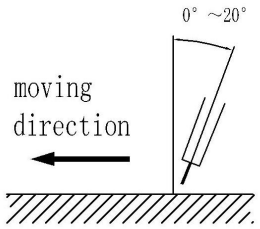
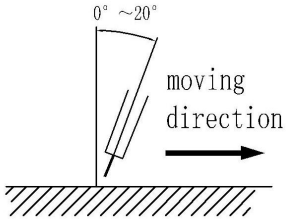
effect:Create blow hole, difficult to start arc, the arc is not stable, insufficient penetration.



effect:The nozzle can be easily blinded,can't seethe sealing wire clearly,and bariable depth the penetration.

8. Put the barrow at the beginning of the welding and adjust the left and right extension of the
   guide bar. The extension of the front side guide bar is a little shorter than that of the back side
   guide bar (along the welding direction.)

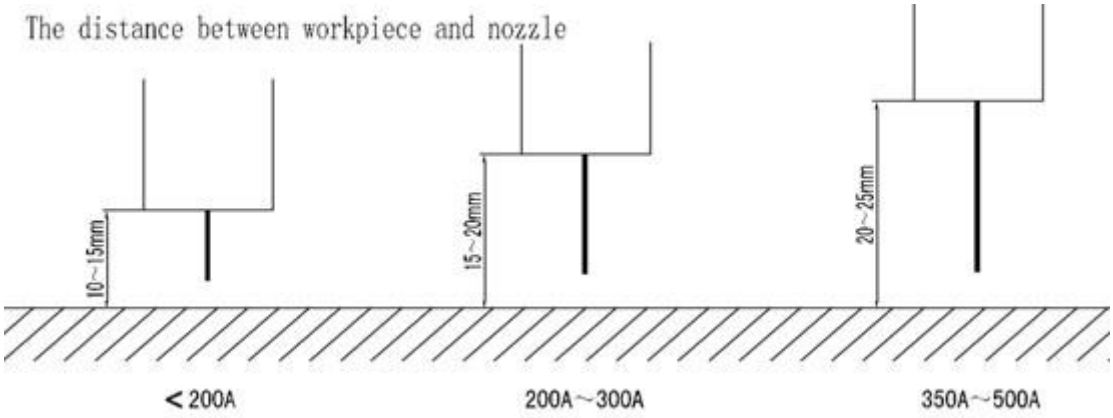
9. Put the torch in the torch clamping fixture and adjust the working and moving angle.

angle	Forhand welding	Backhand welding
The moving angle and direction of the torch		
The section configuration of welding		

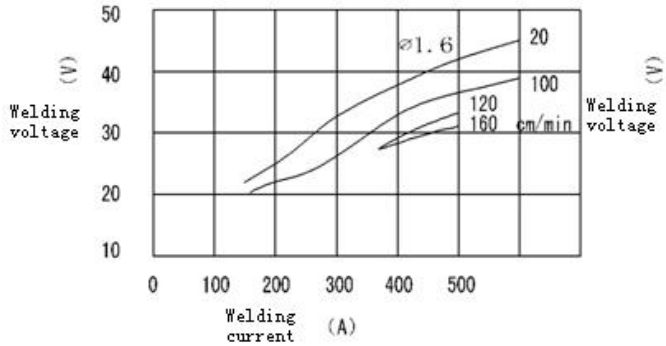
10. Adjust the X-Y gliding block to the torch position and the distance between the work piece and

the nozzle. There will be flaws(blow hole, pit) due to a excessive distance between the work

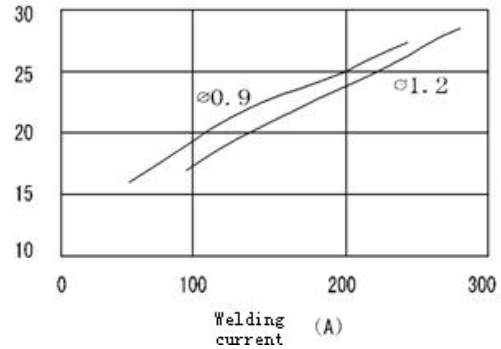
piece and nozzle, adjust it according to the following drawings.



11. Initiative adjustment of the processing parameter (current, voltage)



Welding current and its corresponding voltage



Welding current and its corresponding voltage

12. Confirm the flow of the CO2 and the weld puddle’s protection effect.

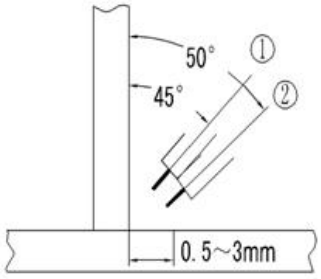
13. Start welding process, observe the arc, adjust the speed of welding and other welding parameters until they are suitable.

14. Press the stop button after finishing the welding process or put an obstacle at the ending of

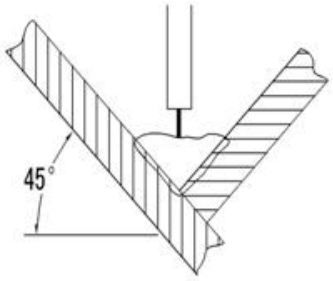
the work piece in order to trigger the inductive stop switch of the barrow.

5 Welding parameter

welding parameter \ welding wire diameter		Φ1.2mm	Φ1.4mm	Φ1.6mm
current (A)	Down hand welding	120-300	150-380	180-430
	flush fillet welding	120-280	150-320	180-380
	horizontal welding	120-280	150-300	180-330
voltage (U)	1. U=14+0.051 2. 300A under U=0.041+16±1.50 3. above 300A U=0.041+20±2.0			
distance between nozzle and workpiece (H)	1. Below 200A: H=10～15mm 2. 200～350A H=15～20mm 3. 350～500A H=20～25mm			
welding extension length (L)	The length is about 10 times welding wire diameter. It is L=10d			



(1)Flush fillet weld



(2)fillet welding in the flat position

1) Flush fillet weld:

Thickness (mm)	(mmk) Length of fillet weld	mm d) Diameter	(A) Current	(V) Voltage	(cm/min) Speed	(mm)Distance between work piece and tip	Position	(L/min) Gas-flow rate
6	6.0	1.2	220-250	25-27	35-45	13-18	①	15-20
	4.0-6.0	1.2	270-300	28-31	60-70	13-18	①	15-20
8	5.0-7.0	1.2	270-300	28-31	55-60	13-18	①	20-25
	7.0-8.0	1.2	260-300	26-32	25-35	15-20	②	20-25
	6.5-7.0	1.2	300-330	30-34	30-35	15-20	②	20-25
12	7.0-8.0	1.2	260-300	26-32	25-35	15-20	②	20-25

Refer to the following swing parameter list:

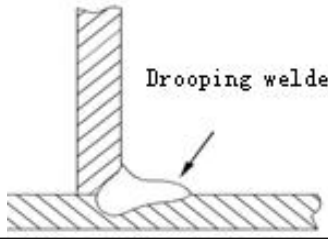
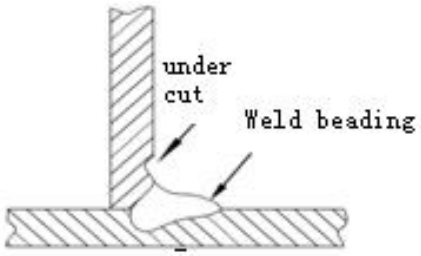
plate thickness (mm)	swing model	swing speed	swing angle	length of stay on right or left (S)
6	saw teeth wave form	4～5	1～2	0.1～0.2
8	saw teeth wave form	5～6	1～2	0.2～0.4
12	saw teeth wave form	7～8	1～2	0.3～0.6

2) Fillet welding in the flat position:

(mm) Thickness	(mmk) Length of fillet weld	(mm d) Diameter	(A) Current	(V) Voltage	(cm/min) Speed	(mm) Distance between work piece and tip	Position
6	4—4.5	1.2	300—330	30—35	60—70	15—20	20
	6—7	1.2	300—350	30—36	40—45	15—20	20

	6—7	1.6	380—400	37—38	45—50	15—20	20
8	6	1.2	300—350	30—36	40—45	15—20	20
	8—9	1.6	430—480	38—42	40—45	15—20	20
12	10	1.6	430—480	38—42	30—40	15—20	20
	12—13	1.6	450—480	39—42	25—30	20—25	20

- Weld defect and the causes

Welding mode	Defect	Causes
Flush fillet weld		1. The current is too high 2. Low striking voltage 3. The welding speed is too slow 4. The position of the torch is not good
		1. Over temperature on the base mental 2. The welding speed is too high 3. The striking voltage is too high 4. the position of the torch is not good 5. The arc length is too long and the striking voltage is too high

6 Maintenance and check of the welding barrow

Periodical trolley maintenance and check is necessary for using CO_2 trolley long time.

（1）Whether too much dust is on the trolley

---Switches on the control box and adjusting welding torch position are usually to keep clean and there is no dust on them.

（2）Whether dirty things are accumulated

---Dirty things on the tip, welding torch head, guide wheel, rubber tire and sliding block are cleared to make sure that trolley works safely.

（3）Whether screws of welding torch fixed mount and guide wheel are loose

---Screw loosing makes trolley walk abnormally and bead non-uniform. Make sure that screws are tight.

（4）Whether adjusting X—Y sliding block is easy.

---Add lubricating oil on the sliding block

（5）Whether joint, connecting wire, flexible pipe and welding torch are broken.

---Check the joint, connecting wire, flexible pipe and welding torch periodically whether they are loose or broken.

（6）Whether abnormal voice and heat are generated

---Check guide wheel, motor and welding torch periodically whether they are abnormal.

（7）Whether fuse is burn out

---Check fuse when power light does not work after connecting wire.

7 Malfunction and recovery of the barrow

The following items is CO_2 trolley error and countermeasure

1) The lamp of control box is not light:

Cause	Correction
The connector of control is not good.	Change control wire
Fuse of control box is burn out.	Change fuse
The power (AC220V) isn't turned on.	Check power

2) Switch is inactive when you begin to weld.

Cause	Correction
Welding wire does not contact well	Clear welding slag
Driving motor is burn out	Change or repair driving motor
Welding/no welding switch is damaged.	Check wire or change the switch

3) Welding point of welding torch can not align aim position.

Cause	Correction
Fixed mount of welding torch is not screwed tightly	Screw fixed mount tightly

4) Sliding block is not adjusted smoothly

Cause	Correction
There is some deposit around the sliding block.	Clear deposit or add lubricating oil

5) Trolley stops welding in auto welding

Cause	Correction
There are some obstacles on the way of trolley walking	Take the obstacles away
There are some deposit on the guide wheel	Clear deposit

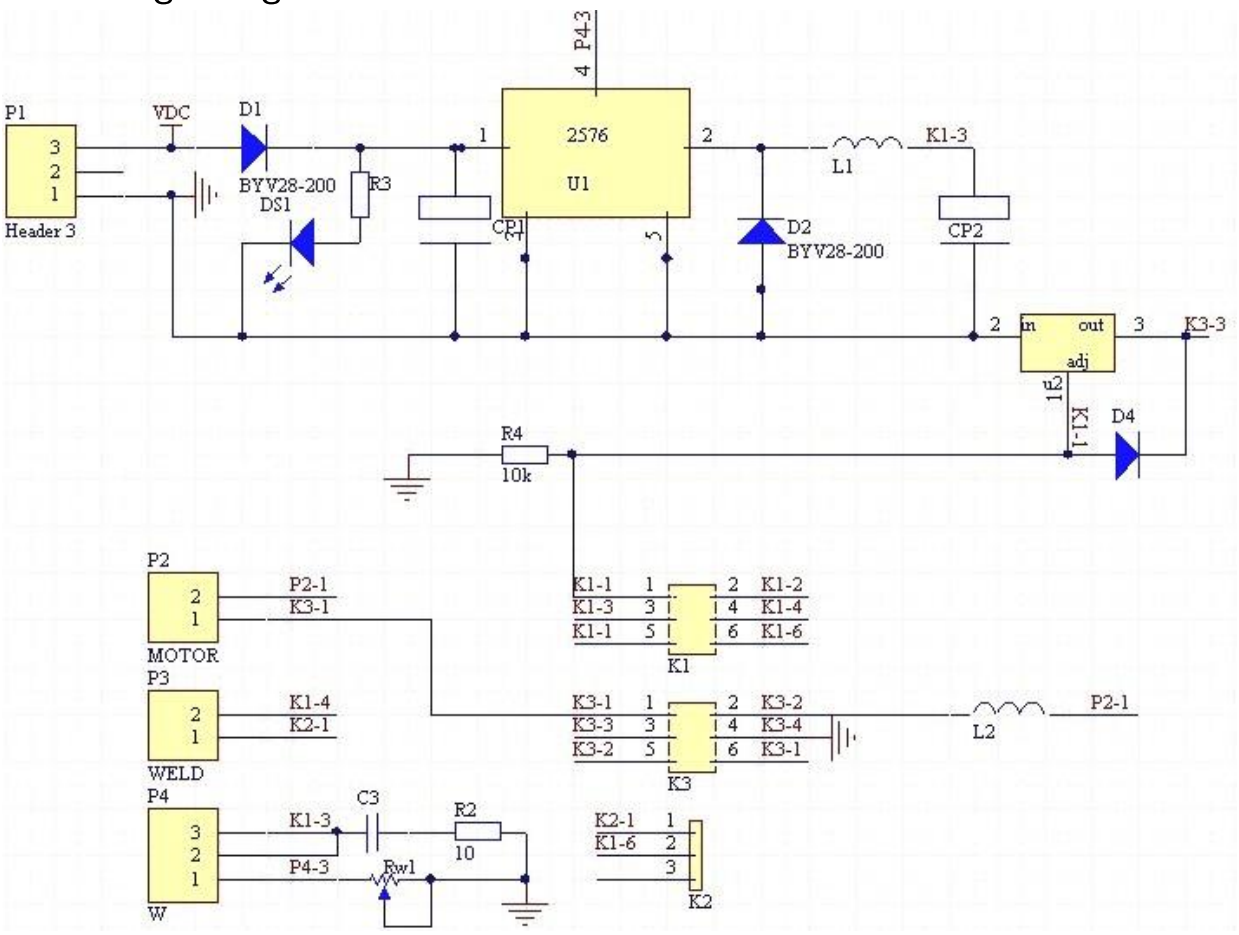
6) Welding arc does not cancel when the welding stop witch is pressed.

Cause	Correction
Welding off switch does not work	Check switch and change it.
Set self-protected circuit switch in the "on" position.	Set self-protected circuit switch in the "off" position.

7) Don't walk along the connecting wire.

Cause	Correction
Position of guide wheel is not fixed well.	Adjust the position of guide wheel again and fix it.

8 Wiring diagram



9 Contents of package

1. Body	1set
2. Regulated power supply DC24V	1set
3. Standard power cord 20m	1set
4. 2Pcontrol wire of blowtorch 5m	1set
5. Fuse 3A	3set
6. Specification sheets (M3、M4、M5、M6)	1 set
7. certificate of qualification	1 set

10 Maintenance illustration

If you operate the machine according to the operating manual and the machine generates occurs accidents because of the product quality, we guarantee to keep the machine in good repair free of charge in half year based on invoice from the day we sell. According to the rules, if the following cases occur, we can't keep the machine in good repair free of charge:

1) The damages are leaded because of incorrect carriage or improper keeping.
2) The damages are leaded because of operating not according to the instruction manual and beyond the specified range of voltage.
3) The machine don't have maintenance card and receipt invoice.

4）The maintenance card don’t match the machine.
5）The damages are leaded by natural disasters or some irresistible incidents.
6）The damages are leaded because the machine is token apart by unprofessional person
7）The damages are leaded because of using the fitting parts and accessories, which don’t belong
to our company.